Date 24-11-2014 (Mid term exam)

Answer the following questions.

Problem number (1)

(a) Consider the discrete-time sequence $x(n)$:

$$x(n) = \{2, -1, 2, \underset{\uparrow}{1}, -2, 1, -2\}$$

Sketch

(i) $x(n)$
(ii) $y_1(n) = x(n)\, u(n-2)$
(iii) $y_2(n) = x(-n)$
(iv) $y_3(n) = x(1-n)$

b) State whether the following system are static, linear, shift invariant, causal, and stable or not.

(i) $y_1(n) = x(n^2)$

(ii) $y_2(n) = \sum_{k=-\infty}^{n} x(k)$

Problem number (2)

Find the inverse Z-Transform of the following function:

$$X(z) = \frac{z+4}{(z-1)^2} + \frac{3}{z+1}$$

Determine the 4-point DFT of the following sequence:

$$x(n) = \{1, 1, 0, -1\}$$

Problem number (3)

pute the circular convolution, $y(n) = x_1(n) \textcircled{4} x_2(n)$, where

$$x_1(n) = \{1, 0, 0, -1\}$$

$$x_2(n) = \{1, 2, 3, 4\}$$